



Operating Instructions  
in compliance with  
Pressure Equipment Directive 2014/68/EU  
and  
Pressure Equipment (Safety) Regulation 2016,  
UK Statutory Instrument 2016 No. 1105

FAS lockable check valve



Please read these operating instructions carefully to ensure a safe operation and keep the same for further use.

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## **Safety**

The FAS lockable check valve, hereinafter referred to as valve, is designed for use in refrigeration/air conditioning systems, hereinafter referred to as systems. It may only be put into service if installed in the system unchanged in accordance with these instructions and in its entirety is in compliance with the statutory provisions.

The valve incorporates state-of-the-art technology and has been built according to the applicable regulations. Great value has been set upon the user's safety.

These operating instructions are integral part of the contract and shall be kept throughout the entire life of the valve.

### **Authorized personnel**

Only trained and instructed personnel shall be allowed to do any work on the valve and system. As regards the qualification and expertise of the personnel the applicable rules and guidelines shall apply.





### **Residual hazards**

Unavoidable residual dangers may emanate from the valve. Every person working on this device shall therefore carefully read these instructions!

To be observed are for example:

- the generally accepted safety regulations,
- EC directives,
- Norms (e.g. EN 378) and all national provisions.






### **Symbols used for safety information**

	<b>DANGER!</b> Instructions on preventing imminent serious dangers to persons. Imminent most serious injuries or death as a possible consequence. Any non-observance may lead to an immediate failure of the valve.
	<b>WARNING!</b> Instructions on preventing potential serious danger to persons. Avoidable serious to very serious injuries or death a possible consequence. Any non-observance may cause the valve to fail.
	<b>CAUTION!</b> Instructions on preventing a minor danger to persons. Minor, reversible injuries cannot be excluded. Any non-observance may lead to a medium-term failure of the valve.
	<b>ATTENTION!</b> Instructions on preventing potential damage to equipment. Minor, reversible injuries cannot be excluded. Any non-observance may lead to a medium-term failure of the valve.

## General safety information

These operating instructions are based on the safety requirements of EN 378-2 and EN 12284.

Instructions to prevent hazards in all cycles of service life:

	<p><b>DANGER!</b> Risk of bursting if operated beyond the technical parameters. Most serious injuries and immediate system failure possible. Observe the technical parameters.</p>
	<p><b>WARNING!</b> Damage due to improper handling. Serious injuries and system failure possible. Never use valves as transport, lifting or lashing points.</p>
	<p><b>WARNING!</b> Any non-observance of the instructions may cause the valve to fail. Avoidable serious to very serious injuries or death possible. Installation, operation and maintenance by authorized personnel only.</p>
	<p><b>WARNING!</b> Risk of service fluid to be released. Depending on the kind of service fluid serious to very serious injuries or death possible as a consequence. Wear personal protective equipment (e.g. respirators, gloves).</p>
	<p><b>CAUTION!</b> Very cold or very hot surface temperatures possible. Frostbites/burns possible. Wear personal protective equipment (e.g. respirators, gloves).</p>

## Other information

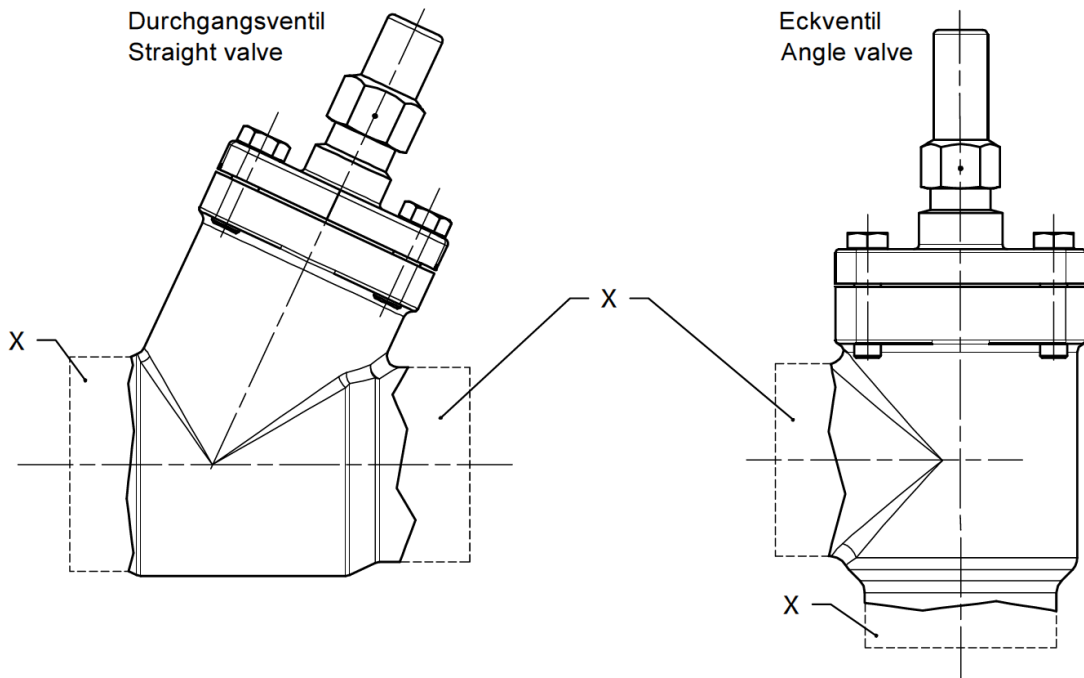
The information contained herein represents to the best of our belief our knowledge at the time when these instructions were prepared. It shall serve as code of practice to ensure a safe handling of the valve in transport, storage, installation, commissioning, maintenance and dismantling/disposal. A final decision as to whether the valve suits the purpose is to be taken by the user. This information shall not be deemed a warranty of quality.

Any modification of the valve and operation under other than the prescribed parameters shall not be allowed and will result in the loss of the conformity declaration and all liability claims.

## Description of valve

### Types

Valve for pipe installation in straight and angular form with protective spindle cap.



Variants of connection X

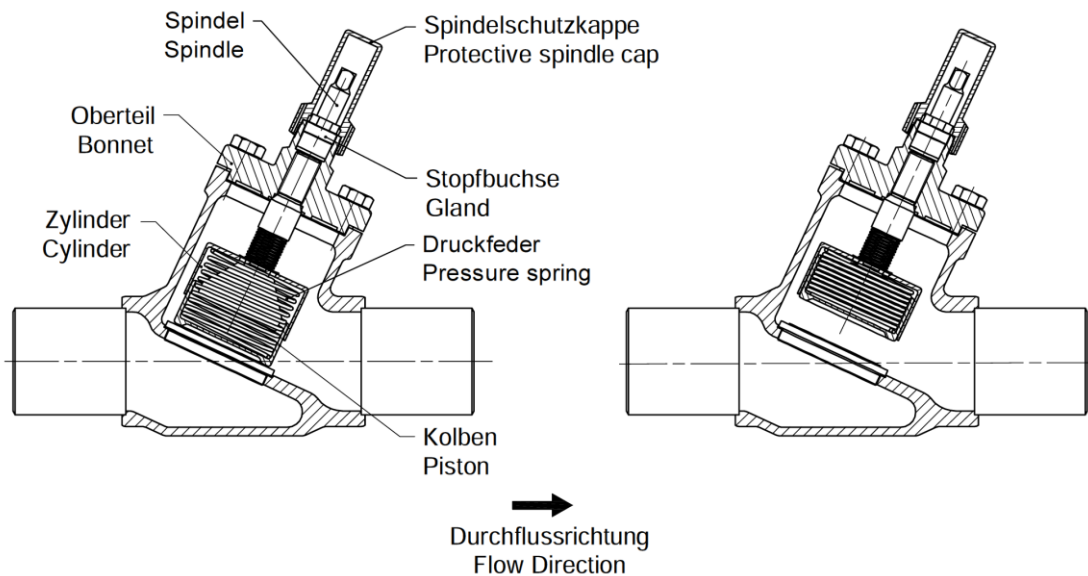
A	B	C	D
Lötanschluss Solder connection ODS	Stumpfschweißanschluss Butt weld connection WB	Lötanschluss Solder connection ODS	Schweißanschluss Weld connection WB/ W/ ODS/ WS
Buchsenflansch mit Lötbuchse/ Jack flange with solder bush lösbar/ detachable	Schweißflansch/ Weld flange lösbar/ detachable	verkupfertes Stahlrohr/ copper-plated steel pipe nicht lösbar/ non detachable	Stahlrohr/ Steel pipe nicht lösbar/ non detachable

Installation dimensions can be gathered from the AWA product catalogue and technical documents respectively. The connecting options are explained in more detail in "Design features".

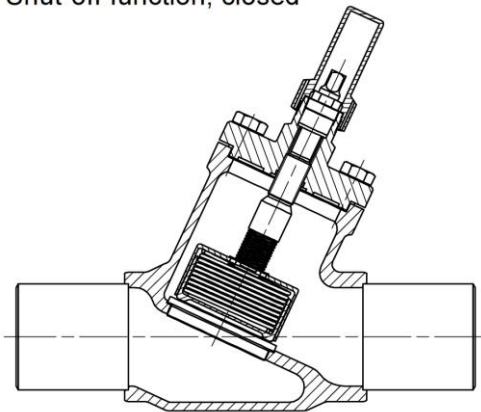
## Operating principle

Rückschlagfunktion, geschlossen  
Check function, closed

Rückschlagfunktion, geöffnet  
Check function, open



Absperrfunktion, geschlossen  
Shut-off function, closed



## Product description

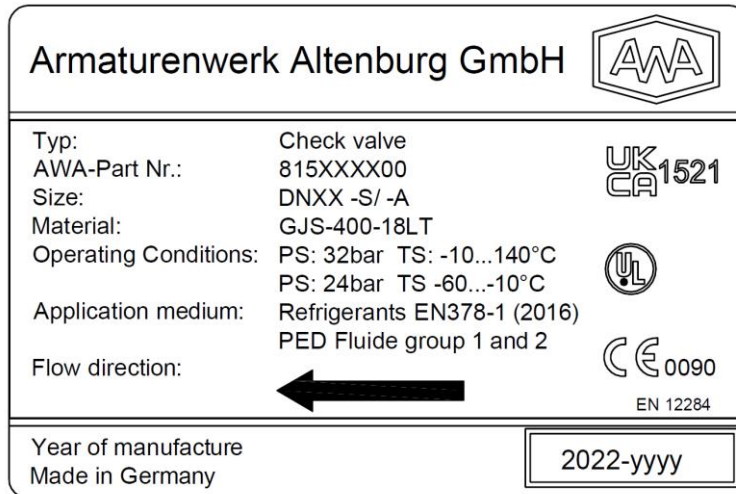
The valve is intended for refrigeration or air conditioning systems. It is a manual lockable check valve.

The prescribed flow direction is marked with a direction arrow on the name plate.

The valve is in compliance with EN 12284, the Pressure Equipment Directive 2014/68/EU and the Pressure Equipment (Safety) Regulation 2016, UK Statutory Instrument 2016 No. 1105.

## Identification

The valve is marked in accordance with EN 12284 by name plate:



## Technical parameters

### Allowable pressure/ temperature / service fluids:

Maximum allowable pressure PS:	PS 32bar	PS' 24bar
Allowable temperature TS:	TS -10 ... 140°C	TS' -60 ... -10°C
Permitted service fluids:	Refrigerant acc. to EN 378-1 (2016) As indicated in the technical documents.	

### Leakage test:

according to DIN 8964-3 (<4,1 g/a R-134a at 10bar)

### Strength test:

according to EN 12284 at 1.1fold PS

### Cleanliness of interior:

according to DIN 8964-1

### Classification pursuant to Pressure Equipment Directive 2014/68/EU and PE(S)R 2016:

valve DN25	Article 4 (3) respectively Part 1 Regulation 8
valve DN32 to DN80	Category II

### Approval under UL 207

The valves are UL 207 approved for the US and Canadian market.

### Opening differential pressure:

As standard the opening differential pressure is about 0,04bar.  
Different opening differential pressure are possible on request.



## Design features

- The material of the valve components and the manufacturing method are selected in conformity with the EN 12284, the Pressure Equipment Directive 2014/68/EU, the Pressure Equipment (Safety) Regulation 2016 and the RoHS Directive 2011/65/EU thus guaranteeing the reliability for the operating range indicated.
- The valve housing and bonnet material of cast iron (EN GJS-400-18-LT) provides for both a high degree of media compatibility and corrosion resistance.
- The use of temperature-resistant materials, connecting elements and jointing methods obviate the need of dismantling when the valve is installed (brazing and welding) in the system.
- The prescribed flow direction is marked with a direction arrow on the name plate.
- The check valve comes with metal sealing. The valve seat and piston are precision-machined and thus designed for a long service life. The cylinder has got relief holes being shut by a disk/spring unit (additional damping).
- The valve spindle is designed with a square for actuation and has a metal back sealing function. The latter is only operative when the valve is fully open. The sealing between spindle and housing is by a graphite packing and adjustable gland seal.
- The valve is supplied as standard with a pressure-tight stem protection cap with pressure relief device.
- Types of connection:

**Connection "A" & "C"** – Brazed capillary connection to render a brazed joint with copper pipes according to EN 12735-1 for dia. 28 to 88,9mm and relevant inch dimensions. Designed as connection for insertion of a copper pipe (ODS).

Abbreviated designation: ODS xx (xx stands for relevant size in mm or inch).

**Connection "B" & "D"** – Butt weld connection according to EN 12627 to weld on pipes according to EN 10220 for DN25 to DN80 as well as corresponding inch dimensions.

Abbreviated designation: WB xx (xx stands for relevant size in mm or inch).

**Connection "A" & "B"** – The flange connection between pipe and valve is a tongue-and-groove system with fibre gasket.

- When supplied the valve is painted. This coating provides corrosion protection until installation provided handling and storage takes place in dry condition.
- The service-friendly design makes it possible to purchase spare parts (bonnet assembly with spindle, gland, cylinder, spring, piston, as well as gaskets or protective spindle cap) separately.

## Transport and Storage

Transport the valve by closed means of transport in the original packing protected against weather influences and store it in dry rooms.

## Mounting

### Principles

- The valve shall be arranged in the system so that it can be properly installed, operated and maintained. Depending on the weight, installation aids must be provided.



#### **DANGER!**

Damage to valve possible.  
 Serious injuries and system failure during operation possible.  
 Valve to be installed without additional loads (forces, vibrations etc.). Never use the valve as fixing points of pipes.

- The dismounting space for mounting, spindle actuation or maintenance of the bonnet assembly shall be about 200mm.
- It must be possible to apply the necessary torques to operate the spindle (opening and closing) in a safe manner.
- The prescribed flow direction is marked with a direction arrow on the name plate.
- An optimal functionality of the shut-off action is achieved in vertical mounting position with incident flow from below. A horizontal mounting position of the check valve is also possible.
- The valve must be integrated into the pipe on both sides. An outlet side open to the outside is not permitted!
- Only authorized personnel shall be allowed to mount the valve.



#### **DANGER!**

Any non-observance of these instructions may cause the valve/system to fail.  
 Most serious injuries and death possible.  
 Mounting and operation by personnel trained in refrigeration systems only.

- No modifications of the valve permitted. If modifications become necessary, they have to be agreed with the manufacturer in writing prior to mounting.



#### **WARNING!**

Product features may change.  
 Avoidable serious to very serious injuries or death possible.  
 Any modification of the valve has to be agreed with manufacturer in advance.

### Mounting preparation

- When supplied the valve comes with additional protective means for transport. To avoid corrosion inside the valve and contamination, such protective means should be removed shortly before mounting.



#### **ATTENTION!**

Damage to interior components possible.  
 Malfunction due to oxidation/contamination of interior components.  
 Wait to remove the transport protection until shortly before mounting.

- Connections A & B only: Remove connecting parts (flange bolts, connecting flange, gasket). Safekeep these components for future use.
- Connections C & D only: Arrange the spindle in central position (loosen the gland by ¼ turn). The valve top needs not be removed.



#### **ATTENTION!**

Damage of internal components possible.  
 Malfunction of valve due to thermal overload.  
 Centrally arrange the spindle for thermal joining processes.

## Connecting the pipe

- Make the connection of the inlet and the outlets in compliance with the following connection-specific principles:

The pipe must be of a dimension that fits the valve. If not, use adapters.

Make sure there is no mechanical restraint.

- **For soldered/welded connections:**

Prepare the system connections so (bare metal and grease-free) that a high-quality joint can be achieved.

Scavenge the relevant pipe sections with shielding gas during soldering / welding. A cooling of the valve body for connection C is recommended.

The welding procedure and the filler metal must be suitable for the material of the valve connection (Flange – steel S235; Welding socket – steel P235 or P355) and the material of the pipe.

Then, cool down the system connection in the air.

Clean the pipe connection made. Residues from the welding-/soldering process are very corrosive and may cause long-term damage or functional faults.



### WARNING!

Damage to valve (e.g. cracking) due to rapid cooling possible.  
Serious injuries and system failure during operation possible.  
Allow joint to cool down in the air.



### WARNING!

Damage of valve due to excessive heating possible.  
Serious injuries and system failure possible during operation.  
Direct the heat source away from valve (soldering temperature max. 850°C)!



### CAUTION!

Risk of increased corrosion and component damage.  
Serious injuries and system failure during operation possible.  
Properly clean the joint after joining.



### ATTENTION!

Possible damage of interior components.  
Malfunction due to oxidation of internal components.  
Scavenge with shielding gas while joining.

- **For screwed connections:**

Make sure that the connections are in conformity in terms of type and dimension and the sealing elements that may be necessary are used.


Make the screw connection between connections parts with pipe and the valve. Initially screw the bolts hand-tight. Then tighten the bolts crosswise in at least 2 stages to the specified tightening torque.

- Depending on the intended condition the spindle must be fully opened or fully closed. Before moving the spindle, loosen the stuffing box by ¼ turn. After the spindle has been moved tighten the gland with the required torque and screw on the protective spindle cap.
- If the assembly is a subassembly, the pipe ends must be sealed with dust protection caps until further use.

- The following torques apply to the valve assembly (Nm):

Valve size	Spindle position		Protective spindle cap	Bolts flange	Bolts bonnet	Gland
	closed	open				
DN 20/25	25 +10	25 + 5	40 +10	M12 50 +10	M8 15 +5	17 +5
DN 32/40	40 +5	30 +10	60 +10	M12 50 +10	M10 30 +5	17 +5
DN 50	40 +5	40 +10	60 +10	M12 50 +10	M12 55 +10	17 +5
DN 65	50 +5	50 +10	80 +10	M16 120 +50	M 16 120 +10	50 +10
DN 80	80 +5	50 +10	80 +10	M16 120 +50	M 16 120 +10	50 +10

Stainless steel screws A2-70 are used for the connecting flanges and the bonnet, the torque specifications apply when using a suitable assembly paste.

	<p><b>WARNING!</b> Any excessive torques or non-observance of the mounting sequence may cause failures. Serious injuries and system failure during operation possible. Observe the torques.</p>
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## Commissioning

### Principles


- The valve have already been tested for leakage and strength by the manufacturer.
- The valve and the system into which it is installed, may only be commissioned if they have been checked, with due regard to the intended mode of operation, for proper condition as to assembly, installation, set-up conditions and safe functioning.
- After mounting and initial start-up according to EN 378-2:2016 by check again for leakage and strength and effective corrosion protection.


### Steps of commissioning

1. Check the system for leakage and pressure resistance by suitable means (e.g. helium, dry nitrogen).

	<p><b>DANGER!</b> Risk of valve bursting. Most serious injuries possible. The test pressure must not exceed the maximum allowable pressure (PS). Strictly observe the safety information (e.g. EN 378).</p>
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2. It is indispensable to apply an anticorrosive coating that meets the operating conditions. Make sure that the fabrication data remain legible.

	<p><b>CAUTION!</b> Delayed failures due to corrosion possible. Serious injuries and system failure during operation possible. Apply a suitable anticorrosive coating.</p>
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	<p><b>ATTENTION!</b> Loss of product conformity due to loss of name plate/markings. Loss of warranty. Marking must be legible.</p>
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## 3. Evacuating and filling the system with refrigerant.


**DANGER!**

Risk of bursting if operated beyond the technical parameters.  
 Most serious injuries possible.  
 Observe the technical parameters of the valve.  
 Avoid excessive filling of the system with refrigerant.

## 4. Depending on the intended condition the spindle must be fully opened or fully closed. Before moving the spindle, loosen the stuffing box by ¼ turn. After the spindle has been moved tighten the gland with the required torque (leakage check). Thereafter, screw on the protective spindle cap. (torques see “Mounting”)


**WARNING!**

Exceeding the tightening torques can lead to damage.  
 Serious injuries and system failure during operation possible.  
 Observe the torques.

## 5. Upon initial commissioning check the pipes for any abnormal vibration and record the operating data.


**CAUTION!**

Cracks of the piping and the valve due to dynamic loads possible.  
 Injuries and system failure during operation possible.  
 Avoid heavy vibrations. Take safety measures if need be.

## Operation, Maintenance and Repair

### Principles

- The valve is maintenance-free.
- As part of the regular system inspection it should be checked for corrosion/damage/tightness and operability and its proper condition restored if necessary.


**WARNING!**

Media contact possible, contact with hot/cold surfaces.  
 Burns, frostbites.  
 Wear personal protective equipment during maintenance and inspections as prescribed by national regulations.

- If the valve spindle is to be operated for system maintenance, carefully remove the protective spindle cap.


**WARNING!**

Protective spindle cap is pressure-tight and may be pressurized.  
 Serious injuries possible.  
 Slowly remove the cap. Allow any service fluid escape from inside the cap if necessary.


- If it is not possible to achieve a pressure compensation, firmly screw the protective spindle cap again and apply the prescribed torque. If so, there is a malfunction of the valve and it will be necessary to check or replace the bonnet assembly (see chapter “Repairs”).
- Depending on the intended condition the spindle must be fully opened or fully closed. Before moving the spindle, loosen the stuffing box by ¼ turn. After the spindle has been moved tighten the gland with the required torque (leakage check). Thereafter, screw on the protective spindle cap. (torques see “Mounting”)


**DANGER!**


Risk of valve bursting.  
 Most serious injuries possible.  
 The test pressure must not exceed the maximum allowable pressure (PS).  
 Strictly observe the safety regulations (e.g. EN 378).

## Repairs

- If a proper functioning of the valve is no longer guaranteed, switch the system off, drain the refrigerant from the system (or system section) in an eco-friendly manner and vent the system (or system section).

	<b>DANGER!</b>
	<p>Refrigerant may escape. Leaking refrigerant may cause most serious injuries. For repairs the system must have the right temperature, free from refrigerant and sufficiently ventilated.</p>

- The valve housing is beyond repair. A faulty valve housing must be removed from the system and replaced by a new one.
- For repairs (valve housing, bonnet assembly with spindle, gland, spring, cylinder and piston as well as gaskets or protective spindle cap) use no other than original spare parts. When removing/installing the bonnet / the flanges from the valve, insert a new gasket.


	<b>WARNING!</b>
	<p>Valve damage due to defective spare parts/mounting. Avoidable serious injuries and system failure possible. Use no other than original spare parts for repairs.</p>


- Install/commission according to these instructions. It is imperative to carry out another leakage and strength test. No warranty is accepted by AWA for tightness in case of repair.

## Dismantling and Disposal

### Principles

- To dismantle the valve, shut off the system, remove the refrigerant from the system (or system section) in an environmentally friendly manner and sufficiently vent the system (or system section).

	<b>DANGER!</b>
	<p>Refrigerant may escape. Leaking refrigerant may cause most serious injuries. For repairs the system must have the right temperature, free from refrigerant and sufficiently ventilated.</p>

	<b>WARNING!</b>
	<p>Media contact possible, contact with hot/cold surfaces. Burns, frostbites. Wear personal protective equipment during maintenance and inspection as prescribed by national regulations.</p>

- The valve and its components can be recycled:
 

Valve housing, bonnet:	cast iron scrap
Cylinder, piston:	stainless steel scrap
Protective spindle cap:	aluminium scrap
Dust caps:	plastics (PE)





**Armaturenwerk Altenburg GmbH**

Am Weißen Berg 30  
04600 Altenburg

Telephone +49 (0) 3447-893-0  
Telefax +49 (0) 3447-811-10

Internet: <http://www.awa-armaturenwerk.de>  
Email: [info@awa-armaturenwerk.de](mailto:info@awa-armaturenwerk.de)

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